



**COLORADO MULTI-JURISDICTIONAL  
VEST ADVISORY COMMITTEE**

**MINUTES**

***BODY ARMOR MANUFACTURER  
DISCUSSION GROUP MEETING***

***November 4, 2005  
633 Seventeenth Street, Suite 1200  
Denver, Colorado 80202***

The Body Armor Manufacturer Discussion Group meeting was called to order  
on November 4, 2005, at 8:37 a.m.

**ATTENDEES**

Colorado Department of Personnel and Administration (DPA)

Rod Wolthoff, CO-MJVAC Chair  
Michael Wallace, CO-MJVAC Vice Chair  
Thomas Wells  
Ronda McGovern, *Staff*



Law Enforcement Representatives

Officer John Abraham, Seattle Police Department  
Lance Davenport, Utah Highway Patrol  
Robert Dirnberger, Colorado State Patrol  
Officer Nancy Gifford, Colorado Springs Police Department  
Commander Gil Otanez, Mesa Police Department  
Sean Foster, Colorado Department of Corrections



Manufacturer Representatives

Stephen Armellino, US Armor  
Georg Olsen, US Armor  
Jody Eberhart, First Choice Armor  
Mike Ott, First Choice Armor  
Ed Dovner, First Choice Armor  
Terry Neve, Neve's Uniforms  
Matt Davis, Armor Express  
Darrell Peetz, DHB, Inc.  
Joe Barker, S & W Bodyguard  
Katie McMillan, MSA  
Paul Banducci, United Shield  
Jim Layman, United Shield  
Jim MaGee, Armor Shield USA



State Agency Representatives

John Baird, Colorado Attorney General's Office  
Frank Volk, Utah Purchasing Department

**I. Introductions and Initial Remarks**

Rod Wolthoff called the meeting to order by welcoming those in attendance on behalf of the members of the Colorado Multi-Jurisdictional Vest Advisory Committee (Committee). Mr. Wolthoff stated that the goal of the meeting was to engage in a lively discussion regarding body armor issues and to solicit opinions regarding recommended minimum standards for quality control, process testing, and warranty requirements.

Those individuals in attendance then briefly introduced themselves to the discussion group.

Mr. Wolthoff provided those present with a brief summation of the CO-MJVAC meeting held on November 3, 2005. *See Attached File: [CO-MJVAC Nov. 3 Minutes](#)*

**II. Administrative**

Michael Wallace expressed his appreciation to Jody Eberhart for organizing the discussion group. The group was convened after several manufacturer representatives expressed an interest in meeting with Committee members and with those responsible for administering the Colorado Verification Test (CVT). Mr. Wallace stated that all manufacturer representatives are welcomed to contact him to discuss the CVT and related issues. This discussion group is strictly advisory to the Committee.

**Committee Participation:**

Mr. Wallace stated that the Committee is interested in inviting participation from additional individuals and agencies throughout the nation, as well as from NIJ representatives. Participation from agency safety coordinators and risk management personnel is encouraged. Several manufacturer representatives have expressed interest in becoming members of the Committee. Initially, only CVT manufacturers were included as members. It is a goal of the Committee to maintain a member balance between law enforcement personnel, agency representatives and manufacturers. Mr. Wallace explained that Second Chance's dissolution did not transfer the company's Committee membership rights to former individual employees. Non-members are welcomed to attend and participate at Committee meetings, but they will not be permitted to vote on official Committee actions. Committee meeting minutes, which are public record, will be posted on the CO-MJVAC website at:  
<http://www.colorado.gov/dpa/dfp/spo/mjvac.htm>

**Budget:**

Mr. Wolthoff and Mr. Wallace explained that, due to budgetary challenges, Colorado does not have an allocated budget for the Committee. The Committee is currently searching for a funding source, but Colorado cannot statutorily collect the revenue.

**CO-MJVAC By-Laws:**

Mr. Wallace reported that, through the Committee's By-Laws, Executive Director Jeffrey Wells has provided governmental immunity to Committee members. *See Section 24-10-103(4), C.R.S.* Mr. Wallace cautioned those present that, for purposes of this discussion group, immunity only applies to Committee members.

**III. Colorado Verification Test History and Test Data**

Mr. Wallace provided a brief explanation of the history of the CVT, and explained how CVT standards differ from NIJ standards. The CVT requires testing on both male and female vests and requires that the testing be performed on actual vests.

**Discussion:**

The new NIJ interim standards have raised questions with manufacturers. Mr. Wallace recommends that manufacturers place an "unofficial" hold on all testing until the NIJ finalizes the testing standards.

**IV. Committee Recommendations to NIJ**

On November 3, 2005, the Committee developed recommendations to provide to NIJ in response to NIJ's Request For Information. The recommendations were summarized for the discussion group as follows:

1. That the NIJ change the size of the required templates for testing to be more indicative of the range of body armor sizing of the officers in the field. In particular, that a "small" size template be used which would reflect those worn by smaller males and females.
2. That the NIJ reduce the number of test shots to three for the "small" panels while retaining the standard six shots for the larger panels, requiring two "small" panels be tested as one complete data set to acquire the statistical data similar to the large panel testing.
3. That the NIJ publish specific guidance on the disposal of expired or used vests.

4. That the NIJ establish reasonable standards for the care, wear, use, inspection, storing, maintenance, and recording of body armor during the lifetime of that armor.
5. That the NIJ require every body armor manufacturer to achieve ISO certification.
6. That NIJ interim standards regarding the submittal of evidence to support the stated warranty period become part of the permanent standards.

## **V. General Discussions**

### **BFS standards:**

60mm backface signature (BFS) is acceptable to human body, but vests are not currently designed to meet that standard. The Committee has not reached a consensus on a new BFS standard, but it is apparent that 44mm BFS is not acceptable. Most manufacturers find BFS test data to be the least scientific. Comparative statistics are not reviewed past the NIJ initial test.

### **Warranties and Budgets:**

The Committee is interested in recommending that testing be required throughout the entire warranty period. Because vests are currently in use, this requirement would have to be transitioned. Currently, NIJ allows manufacturers to simply state that evidence exists that their vests will perform to ballistic standards throughout the warranty period. Manufacturers could incur liability using this standard. From an agency perspective, budgets are based on a five-year warranty cycle. If a manufacturer lessens a warranty period, many agencies would not have the funds to replace vests at the end of the cycle. An agency assumes liability on the first day after the warranty period expires. The current five-year warranty standard is based on Dupont data regarding the evidence of degradation and officer maintenance.

### **V-50 Ballistic Limit Test:**

It is the consensus of Committee members that the V-50 test data received by NIJ is not reliable. The V-50 variation is thirty percent. However, when actual duty ammunition is used, the fluctuation can be up to 100 feet per second. The V-50 standard is not desirable for used vest testing. In order to develop a more reliable standard, the manufacturers would need to release up to five years worth of variations and test data. To date, no manufacturer has provided five years worth of data.

**Vest Disposal:**

Georg Olsen explained that most manufacturers have the ability to destroy used and expired vests. In some instances, an agency would be required to ship the expired vests to the manufacturer for disposal. A few manufacturers do not charge the agencies for shipping costs. Recycling programs do exist. Recycled vests are used in brake linings and pads, not in new vests. Colorado does not have a disposal facility. If the new CVT bid includes recommendations for minimum shipping requirements to those manufacturers incurring shipping costs, it is suggested that the minimum number of vests be set at ten.

**New CVT Bid:**

Mr. Wallace stated that new CVT bid requirements would be developed using input from Committee members. He reported that participation in the CVT bid process has been lacking. The initial 2004 CVT standard was not well received. However, it is believed that manufacturers are now more receptive to CVT standards. If manufacturers participate in the new CVT bidding process and perform used vest testing, they will not be required to retest when the NIJ issues permanent standards.

The new CVT bid may again have requirements for used vest testing of actual vests. Conceptually, an agency would submit one or more used vests to the manufacturer each year for testing. The manufacturer would replace the vest(s) at no cost to the agency. Members of the CVT would coordinate annually so that duplicative tests are not performed on separate models.

Issues of concern include identifying those who will witness the testing and which testing labs will analyze the results. NIJ standards currently state that manufacturers may witness all tests of their products.

***The meeting was adjourned at 9:29 a.m. and called back to order by Mr. Wolthoff at 9:57 a.m.***

**VI. Contributions of Manufacturers**

Mr. Eberhart stated that it is in the best interest of all manufacturers to cooperate in order to improve the industry and to facilitate their recommendations regarding NIJ permanent standards.

Jim MaGee suggested that the manufacturers and the Committee develop recommendations for used vest testing standards. Otherwise, the NIJ could mandate a standard of less than 25mm BFS. Once a recommended standard is developed, the Committee should forward it to participating states for review by their respective Attorney General's offices.

Mr. Wallace stated that it has been difficult to retain the cooperation of individual state agencies. Politically, many states have taken the position that they are not directly involved with the CVT process. This may be a result of the legal issues Colorado has faced from manufacturers in the past. If the manufacturers wish to make a joint recommendation to the Committee regarding used vest testing, the Committee will forward that recommendation on to the NIJ.

Mr. Olsen opined that it is likely that the NIJ will not be receptive to any standard recommendations that appear to be more lenient than previous standards.

*Katie McMillan left the meeting at 10:10 a.m.*

**VII. Discussions Regarding Committee Recommendations to NIJ**  
*(See paragraph IV)*

Recommendation 1: Template Size

**All voting attendees supported this recommendation.** (Several attendees abstained due to lack of authority to speak formally for a manufacturer.)

Recommendation 2: Number of Test Shots

Mr. Eberhart stated that, at this time, the Committee is not recommending changes to current BFS standards. The recommendation is simply to test small vests separately using three shots on two panels rather than six shots on one panel.

Several in attendance expressed concerns that small vests would have to be “overbuilt” in order to meet the 44mm BFS standard, which would affect wearability. Manufacturers might also begin producing all vest sizes to meet the small vest test standards, rather than producing each size in compliance with the individual size standards. Mr. Wolthoff expressed his concern that this mindset is almost an admission that smaller vests would fail if the current standard were retained.

Commander Otanez stated that he is concerned that those officers using smaller vests may not be adequately protected in the field. Officers should be informed if the manufacturers believe that lesser expectations exist for smaller vests. Officers should be given as much information as possible regarding test results so that they can make informed decisions when choosing vests. The first priority is officer safety. Production issues are secondary.

Officer Gifford stated that female officers need assurance that their vests provide the same level of protection as those worn by their male counterparts.

Mr. Wallace opined that it is common knowledge in the industry that smaller vest panels may not provide as much protection as larger vest panels. It is almost a certainty that the NIJ will revise small panel standards work at same level. Future CVT standards will absolutely include small panel standards.

Stephen Armellino stated that a change in the small panel standards would result in a decrease in wear rate and pricing increases. Having served on the NIJ advisory panel, he does not believe that the NIJ will accept the three-shot standard. Further, the NIJ has not been receptive to moving away from the 44mm BFS standard.

Matt Davis reported that the NIJ currently specifies that the six shots be fired from different angles and positions. The highest velocity of shots 2-3 develops the BFS score. Testing smaller panels could increase officer confidence in the product. However, smaller vests would need to be thicker and heavier to pass the testing standards.

Ed Dovner opined that end users would not use vests if wearability diminishes. All manufacturers will have to develop products that the end users will accept.

Commander Otanez stressed that officers simply want a reasonable belief that their vests will stop their own level of duty ammunition. He would agree with the premise of separate test standards for each vest size.

**After further discussion, the majority of voting attendees supported Recommendation 2.** There was one dissention. (Several attendees abstained due to lack of authority to speak formally for a manufacturer.)

*Joe Barker left the meeting at 11:07 a.m.*

#### Recommendation 3: Disposal of Expired or Used Vests

**All voting attendees supported this recommendation.** (Several attendees abstained due to lack of authority to speak formally for a manufacturer.)

#### Recommendation 4: Care, Wear, Use and Maintenance Standards

**All voting attendees supported this recommendation.** (Several attendees abstained due to lack of authority to speak formally for a manufacturer.)

#### Recommendation 5: ISO Certification

**All voting attendees supported this recommendation.** (Several attendees abstained due to lack of authority to speak formally for a manufacturer.)



Recommendation 6: Warranty Period

**All voting attendees supported this recommendation.** (Several attendees abstained due to lack of authority to speak formally for a manufacturer.)

*The meeting was adjourned at 11:13 a.m. and called back to order by Mr. Wolthoff at 11:46 a.m.*

**VIII. New Testing Standards**

Officer John Abraham stated that his Chief of Police in Seattle, Washington is the Chair of the NIJ Safety Committee. Officer Abraham will share the information he obtains through the discussion group with his Chief of Police. As an end user, Officer Abraham is concerned about the fact that the IACP may not seek input from end users. He would like to recommend that the NIJ confer with the 3,000 survivors as well as manufacturers. If the manufacturers can come to a consensus, they could make recommendations to the NIJ that would benefit both end users and manufacturers.

Mr. Wallace opined that the current 44mm BFS standard is too low. Industry wide, vests do not stretch above 48mm without penetration. Officers are not concerned about incurring blunt force trauma. Their primary concern is penetration and most officers would wear vests produced at a 60mm BFS standard that would prevent penetration.

**After further discussion, all voting attendees supported a recommendation that the current BFS standards be increased or removed entirely.** (Several attendees abstained due to lack of authority to speak formally for a manufacturer.)

**IX. Used Vest Testing**

Discussion:

Mr. Eberhart stated that an acceptable buffer variation for fps velocity must be determined. Test ammunition fluctuates at 30fps, while duty ammunition can fluctuate up to 100fps.

Mr. Davis reported that increasing the current V-50 standards ten percent might require and additional 25 percent of material. A one-to-one ratio does not exist.

Mr. Wallace stated that setting a baseline standard for year 0 would account for break-in of the vest, when the most degradation occurs. The baseline standard should not be below 150fps. Mr. Wallace suggested that vests should be tested with 10 duty ammunition shots at 150fps above the standard. If no penetration occurs, then the vests pass. This test would be a pass/fail procedure based only on penetration results, and the tests should be performed with officers present. End users would have more confidence in this type of test.

Mr. Davis opined that, in this scenario, smaller vests should be tested with fewer than ten shots. Large vests could be tested with 10 shots, medium vests tested with 8 shots, and small vests tested with 4 shots.

Mr. Wallace suggested that agencies could pick which used vests would be tested based on condition and wear.

Commander Otanez stated that manufacturers must test used vests from all areas of the country to account for all climatic conditions.

**All voting attendees agreed to refer to this “10-shot” testing concept as the Verification Equivalency Shot Test (“V.E.S.T.”) Protocol.**

**Further Discussion:**

If BFS standards are increased, different backing materials, such as ballistic gel, may be required. Mr. Dovner expressed his opinion that sufficient data does not currently exist to make an informed recommendation regarding backing materials. Mr. Dovner disagreed with requiring individual location tests because manufacturers do not consider climatic differences in production.

Mr. Armellino and Mr. Davis agreed that testing should occur in laboratories for consistency and in order to control variables.

Mr. Wallace, Mr. Eberhart and Mr. Davis expressed the opinion that vests should be tested in wet conditions. Mr. Dovner disagreed, stating that manufacturers will replace vests that are exposed to extreme wet conditions. Terry Neve suggested that, should testing occur during each year of the warranty period, one of those years could be a wet test. Mr. Wallace stated that the new CVT bid would probably require wet testing.

**After further discussion, all voting attendees supported the recommendation that used vest testing occur in laboratories, using clay as the backing material. The attendees agreed that the discussion group’s recommendations would not address the wet/dry testing issue at this time.**

*The meeting adjourned at 1:01 p.m.*